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taught directly, not by the subterfuge that they could only follow from religious acts, therefore it is necessary to teach religion—but if made a part of the curriculum I should like to know how large a place our professors would be likely to assign them. Would a three years' course seem too short, or a four year, perhaps, too long to teach a boy that honesty and good habits are right, and the opposite are wrong? Or would such things be assumed to have been taught during childhood in the only proper place—at the mother's knee?

Since Chancellor Strong lays emphasis on the statements, that "after all . . . ours is a Christian civilization," and "Historical Christianity is the basis of our whole life, and we as a nation shall stand or fall with it," he must then mean by the "moral and religious problem confronting education in Kansas as elsewhere" the question of how to bring about the teaching of Christianity by compulsion and at national or state expense, an attempt as out of joint with the times as with the purpose of the founders of the country, that church and state should be forever separate.

HENRY K. WHITE

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SCIENTIFIC BOOKS

THE EASTMAN-ZITTEL PALEONTOLOGY

THE appearance of a second and very much enlarged edition of Dr. Eastman's English version of Zittel's "Paleontology" (Volume 1, Invertebrates) may be accepted not only as an acknowledgment of the usefulness of the work but also as a response to a growing interest in the study of ancient life. It is very probable that the justification for the revision of this expensive and elaborate work comes chiefly from the American demand, and, if this is true, the demand may perhaps be counted among the first fruits of the efforts made by The Paleontological Society to encourage and widen a deeper concern in that field. While this statement has reasonable worth, yet the fact stands out clearly that the Eastman-Zittel "Paleontology" is by far the best, practically the only satisfactory general guide-book and compendium of the science. Even

the first edition was a more useful book than the German original because of its greater detail and closer analyses, though we have been given to believe the innovations in classification introduced by the first collaborators were not altogether acceptable to the lamented and distinguished author, Professor Zittel. But in a science which covers the whole field of life, progress must be rapid; new encyclopedias soon become old as new lands are explored and old ones more closely scrutinized, and old philosophies and classifications give way under the burden of new knowledge. No one person could to-day successfully do what Zittel did—write a book covering the entire field of ancient life. Versatile as he was in many departments of paleontology, competent to expound as he did the structures of sponges and dinosaurs, to-day such diverse efforts would be looked upon with a grave hesitancy by students generally, that would assuredly weaken the voice of authority.

So, in this new book, there is a divided authority, even more pronounced than in the first edition, and the American author, Dr. Eastman, modestly withholds his own name from any acknowledged responsible share in the separate chapters, which leaves us to infer that he did all the work the others did not do (no small amount when one analyzes the allotments) and of course did the real work on the rationale of all the combined chapters.

In giving to *SCIENCE* a notice of this work, it seems appropriate to restrict it essentially to the new material, either in the form of accretions from later discoveries or of revised classifications, and to present these new features succinctly and with precision the reviewer has asked most of the contributors to briefly state the differences between the old and the new in the chapters with which they have been severally charged.

In the 1899, or first, American edition there were 12 collaborators; in this edition of 14 years later there are 17 coworkers, and but three names of the first list remain on the last: Dr. Dall, Professor Schuchert, Mr. Clarke. The increase in the number speaks of greater refinement of knowledge as well as of wider activity of research in the later years.

The Foraminifera (Joseph A. Cushman) have been given a fuller introductory discussion and the classification is essentially made over. Though without additional illustration, the chapter is essentially new.

The Porifera have been amplified (by the author-editor) with additions on the Hexactinellids, and it is interesting to note the elevation of *Receptaculites* and *Ischadites* from a footnote to a place in the text body.

Regarding the Anthozoa, which have been revised by T. Wayland Vaughan, the editor remarks that the classification adopted, "although perhaps as good as any available, is tentative in character." Among the Tetra-coralla there are few changes; in the Hexa-coralla Dr. Vaughan has added some important text and illustrations in the general discussion and in the classification are some noteworthy alterations. We notice the family Fungidae and its allies created into a sub-order Fungida, and the omission of the Madreporidae (on the assumption that they do not occur fossil). The extensive array of tabulate corals or favositids is no longer an "appendix to the Hexacoralla" as in the first edition, but more conservatively expressed as an "appendix to the Anthozoa." Into this group *Chaetetes* is admitted, but *Monticulipora*, *Fistulipora* and their allies are put back again among the Bryozoa.

The Graptolitoidea (R. Ruedemann) formerly standing in an "Appendix to the Campanulariæ," are likewise more broadly considered as a "Class or Subclass of the Hydro-medusæ." This chapter has been considerably enlarged in text and illustration and the taxonomy rectified by substituting for the oddly incongruous *subordinal* terms of the early edition Monoprionidae, Diprionidae, etc., the classification wrought out in the author's well-known memoir on these organisms.

The Vermes have been amplified by the introduction of Walcott's recent remarkable discoveries in the Cambrian.

A number of collaborators have revised the Echinodermata: Frank Springer, the Cystoidea, Blastoidea and Paleozoic Crinoidea; Mr. Springer, with A. H. Clark, the Post-paleozoic

Crinoidea; H. L. Clark, the Asteroidea and Holothuroidea, and R. T. Jackson, the Echinoidea. These are distinguished authorities and the amendments they have made must be regarded as well up to the present state of knowledge of these groups. In Mr. Springer's part of the work there is an enlargement of about nineteen pages, and in the classification of the Crinoidea the two authors have rearranged the divisions in better harmony with their geological succession and their recognized structural relation. A striking feature is the inclusion of the stalked pentacrinites and the unstalked comatulids in one family and the union of the genera *Marsupites* and *Uintacrinus* with the comatulids.

A singular and rather confusing thing in this connection is an incongruity in classification which must have escaped the author's eye. The family Pentacrinidae is divided into three sections, one of which, the "comatulids," is divided into three "tribes." The second of these tribes is made to contain many genera grouped into a large number of different *families*.

Mr. H. L. Clark has given an entirely new classification of the Asterozoa and has amplified the chapter on the Holothurians, including even the Cambrian species discovered by Walcott, though he has elsewhere gone on record as doubting the echinoderm nature of these fossils.

The Echinoidea have been brought up to the stage of Dr. Jackson's exhaustive knowledge of the group, expressed in his recent elaborate treatise on these bodies. New cuts are introduced, some showing structural characters of the group as a whole and others representative Paleozoic echini. In the classification the arrangement is in natural phylogenetic sequence based on a comparative study of development and adult structures.

In the Bryozoa by R. S. Bassler, the Monticuliporoids, which in the last edition were made to appear in the "double and daring act" of both Bryozoa and Anthozoa, are now excluded from the latter, as just observed, because of the recent demonstration of their early budding phases. A revised classification

is presented of the Cyclostomata, with 5 suborders, one of them, "Ceramoporoidea," being new; a natural division given of the *Trepotomata* and the most recent work on the *Cheilostomata* is included.

In the Brachiopoda (Charles Schuchert) the form of the chapter and the general principles of the classification have been retained, but the latter has not only been elaborated to such completeness as to assemble all outstanding generic divisions of which the later years have added no small number, but have been illuminated by the expression of phylogenetic lines and terminals. This procedure has made necessary the introduction of a good many new divisions of supergeneric value, but it conveys a conception of developmental relationships never before so well expressed.

The chapters on the Pelecypoda, Gastropoda and Pteropoda have undergone no material changes except for the inclusion of new generic terms (W. H. Dall), but in the Cephalopoda by J. Perrin Smith there are notable expansions in both matter and illustration. For some reason the Nautiloidea have been left pretty much as they stood before, though a great deal of work has been done on the group in the last 14 years by Germans and Americans; but the Ammonoidea have been amplified by many new cuts of Carbonic, Permian and Triassic forms. It will surprise many students of this group to find Hyatt's classification, adopted in the first edition, quite entirely cast out in favor of the German taxonomy as expressed by Zittel and of late years amplified by European students and by Dr. Smith, himself a collaborator with Professor Hyatt. The present classification is in a way a trial adjustment of the old and the new.

The Trilobites have been revised by P. E. Raymond, who has enlarged the generic list from 55 genera in 14 families, as in the first edition, to 126 genera in 28 families; a statement which indicates the persistent and growing interest in this group of fossils. The principles of the classification are those followed by Beecher in the first edition. The reviser has incorporated his own interpretation

of many old and rather vaguely defined names, such as some of Corda's and Angelin's, with a generous number of new generic conceptions based upon his own researches.

The Branchiopoda and Ostracoda have been brought up to date by R. S. Bassler with a considerable number of new figures. The Cirripedia and Malacostraca (by William T. Calman; Phyllocarida by J. M. Clarke) are not materially unlike their earlier presentation, while the Arachnida-Merostomata (J. M. Clarke) have been considerably revised with some substitution of old for new illustration, especially of restorations based on the researches recently published by Clarke and Ruedemann. The Arachnida-Embolobrachinata (Alexander Petrunkevitch) are brought into line with recent discoveries with some additional illustration, and the Myriapoda stand very much as they were left in the old edition.

Mr. Anton Handlirsch's chapter on the Insecta is a wholly new and original document of thrice the text matter and twice the illustration of the former edition. The general discussion and the classification are so entirely unlike the original that even a trace of the latter is hard to find. It may well be regarded as the best present expression of information regarding this group.

JOHN M. CLARKE

School Health Administration. By LOUIS W. RAPEER, New York Training School for Teachers. Published by Teachers College, Columbia University, New York City.

Part I, pp. 1-70, gives an outline of national health problems in their relations to the school. Part II, pp. 71-294, summarizes the findings of an intensive study which the author has made of the methods and results of school medical service in twenty-five typical cities in the eastern states. Part III, pp. 295-358, offers a tentative standard plan for the administration of school health work.

The book is the fruit of several years of first-hand investigation of the methods of medical inspection as it is actually carried on. The author goes behind the glowing accounts

found in the reports of superintendents and school doctors, and measures the efficiency of the systems by the application of a few common-sense statistics and the principles of scientific management. He shows in a most convincing way the inefficiency of some of the methods in vogue and offers a plan which ought to be taken as a model until experience shall have given us something better.

The book reveals a broad grasp of the larger significance of educational hygiene, and points clearly to the many dangers of misplaced emphasis in this new but promising field of child welfare. It should be studied especially by school superintendents, school doctors, school nurses and social welfare workers.

The appearance of the book is somewhat marred by a rather unattractive make-up; and the author's style, while vigorous and interesting, is not always as direct and clear as one would like.

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INVESTIGATIONS IN THE ATLANTIC OCEAN¹

MEASUREMENTS of the temperature and salinity of the surface water of the Atlantic Ocean have for many years been carried out by route steamers and other vessels traversing these waters. The necessity of systematically conducted investigations, of both hydrographic and biological character, not only at the surface, but also in deep water, is pointed out. Such a systematic investigation of the whole of the Atlantic Ocean must be regarded as one of the most important scientific and practical tasks of the future.

Pettersson and Drechsel were intrusted by the Central Bureau of the International Study of the Sea, with the task of drawing up a memorandum as to the ways and means by which an international reconnaissance of the Atlantic Ocean could be organized in the near future. These gentlemen have conferred with

¹ Abstract of a report by Pettersson and Drechsel. The address of Pettersson is: Professor Otto Pettersson, Holma i Brastad, Sweden.

many of the leading authorities on oceanography in other countries.

The authors concluded, as the result of such conferences, that the matter could not be farthered by the ordinary discussions and resolutions on the part of learned societies. The only way was to seize the first favorable opportunity of commencing the investigations. The first trans-Atlantic hydrographical investigation would probably have to be made from ships in the naval service. Coastal seas could be studied only by real investigation steamers, specially fitted for fishery-biological work.

The following program was drawn up:

- I. Investigation of Coastal Seas;
- II. Transatlantic Investigation.

These investigations are to be carried out simultaneously, since in this way a more comprehensive view can be obtained of the actual condition of the Atlantic Ocean in summer and winter. After the general survey has been made, special investigations of individual questions can be taken up. To complete such investigations it is important that the countries bordering on the Atlantic Ocean should cooperate. Great Britain and the United States have already cooperated, and France and Canada should also participate. For the investigation of the coastal seas, the following program is suggested.

(a) Quarterly cruises to be made to the *northeastern part of the Atlantic water system*, from Iceland to Spitzbergen, including the North Sea, the Skagerack, the Cattegat and the Baltic.

(b) In reference to the Iceland-Faeroe-Wyville Thomson ridge, the Rockall channel and the mouth of the Channel, it is to be hoped that the former will be investigated by the Scottish, Danish and Norwegian commissions, and the mouth of the Channel by the Irish Fishery Department.

(c) In the sea east and west of Greenland the determination of the conditions with regard to ice is of prime importance. The Danish Meteorological Institute has already done good work in this field.

(d) We do not possess a single hydrographical section through the Labrador current, and